

INTRODUCTION

Exocrine pancreatic insufficiency and malnutrition after gastrointestinal surgery

Christos Dervenis

First Department of Surgery, Agia Olga Hospital, Athens, Greece

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Correspondence

Christos Dervenis MD, FRCS, Head, First Department of Surgery, Agia Olga Hospital, Athens 14233, Greece. Tel: + 30 210 277 5467.

Fax: + 30 210 279 3969. E-mail: chrisder@otenet.gr

Pancreatic insufficiency after gastrointestinal surgery is of great importance as it is directly related to a patient's nutritional status. Unfortunately, the gravity of the situation is usually underestimated and treatment is often not administered, resulting in malnutrition, weight loss and impaired quality of life.¹

The gastro-pancreatico-duodenal complex plays an important role in the digestion of food. The initiation of digestion starts within the stomach with the action of pepsin and hydrochloric acid. Then the small nutrient particles arrive in the duodenum and mix with the biliopancreatic secretions. The gastric emptying process is coordinated by two main reflexes: the antro-fundic and the duodenogastric. At the same time, fundic distension and the presence of nutrients in the duodenum provoke pancreatic secretion through the release of cholecystikinin (CCK) and the main digestive function starts.

The alteration of gastrointestinal anatomy as a result of any of a variety of different surgical procedures targeting the stomach and the pancreas has a direct impact on digestion. Because of the loss of normal gastric emptying and hormone release, gastric resection has been proven in a number of studies to lead to a decrease in pancreatic juice volume and consequently the secretion of enzymes such as trypsin, chymotrypsin and amylase, as well as a reduction in bicarbonates. This also happens following pancreatic resection, regardless of its extent, at least during the first few months after surgery. Although there are some differences in CCK release and consequently in the severity of malnutrition after different operations (e.g. Kausch-Whipple resection or pylorus-preserving pancreatic resection), the implications of these have not been proven in the published randomized studies looking at this issue.²

Diagnosis of malnutrition caused by exocrine pancreatic insufficiency (EPI) is mainly based on clinical grounds. As oral pancreatic enzyme replacement therapy (PERT) has been proven efficient in controlling malnutrition, there is a need for a specific test that can detect the level of exocrine pancreatic function in

the circumstances of gastric or pancreatic resection, in which the mechanism of maldigestion is complex. It seems that faecal fat quantification and the ¹³C-mixed triglyceride breath test are the most accurate and thus most important tests available in clinical practice.^{3,4}

The aim of therapy for EPI is to reverse all secondary clinical events caused by enzyme deficiency. In order to achieve this goal, a combination of general and dietary measures together with oral PERT is mandatory. This requires the patient to maintain a balanced diet that accounts for glucose tolerance and considers fat consumption. Standard treatment should include oral pancreatic enzymes, which have been proven in many studies to effectively control patient nutritional status and prevent longterm malnutrition, excessive weight loss and severe symptoms by improving the absorption of dietary fat and protein. Independent of the availability of a test to detect EPI, almost all patients who undergo upper gastrointestinal surgery should receive PERT immediately after surgery and should be subject to regular assessment to ensure good nutritional status is maintained and symptoms are adequately controlled.⁵

Needless to say, a combination of different enzymes, as provided by available PERT products, should be included in the treatment regimen. Impairment of absorption concerns all the different nutrients, but the maldigestion of fat is among the most prominent. Not many adequately powered studies have compared different enzyme preparations for the treatment of maldigestion after gastrointestinal surgery. However, enteric-coated enzyme microspheres have been shown to be associated with a higher gain in body weight. Another important issue is PERT dose, which should be individualized depending on the degree of maldigestion and dietary fat content; using a PERT dose selected to meet the needs of the individual patient can make substantial differences in terms of efficacy.

Gastrointestinal surgeons are ideally placed to ensure that their patients' EPI is appropriately managed both in preparation

for surgery, if necessary, and immediately following surgery, in collaboration with gastrointestinal specialists and other health professionals.

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Conflicts of interest

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